University of Washington

ARBORETUM BULLETIN

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Concerning this issue. . .

This issue of the *Bulletin* contains some interesting and varied articles. Journey to Western Australia with Joseph W. Miller as he shares with us his flower-filled trip to the "down under". Michael Lee explores the potentials for Northwest gardens of an Australian native, the eucalyptus. Compare garden notes with Brian Mulligan, who reports to us about the plants that were damaged during the 1983/'84 freeze and how they are recovering. In the next issue of the *Bulletin* there will be an article about winter damage to the Carl S. English Gardens.

A hearty thank you to those of you who participated in our random phone survey about the *Bulletin* and how to make it better. We will try to incorporate your ideas. If you were not called and have thoughts about the *Bulletin* which you would like to share, please call us at 325-4510.

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The Appropriate *Eucalyptus* Hardy Species for Northwest Gardens

MICHAEL LEE

Michael Lee is a Eucalyptus *grower and fancier. His enthusiasm and optimism may eventually result in the introduction into the Seattle area of a larger number of eucalypts than are presently being grown. The cultivation of* Eucalyptus *in the Northwest is still experimental, but through research and testing, the appropriate eucalypts may be found.*

In addition to his work on eucalypts, Mr. Lee is writing a book on native and exotic trees and shrubs for Northwest gardens.

No wonder people get excited about *Eucalyptus*! The fastest growing species can add twelve feet a year; the tallest rivals the redwoods in height. The flowers shed their petals as they open yet include some of the world's showiest blooms. Their leaves smell of cold-medicine but are the koala's only food. Planted by the millions, the eucalypts have transformed landscapes and economies around the world.

Though part of the widespread family Myrtaceae, the genus *Eucalyptus* is a typically Australian oddity. In the wild, its nearly 600 species are almost entirely restricted to that continent and comprise over 85% of its tree flora. In the manner of the Galapagos finches, the eucalypts have spent millions of years of isolation working their way into nearly every conceivable ecological niche. There are desert mallees (low, scrambling trees) eking out an existence among sunscorched boulders, and giant gums raising dark, shaggy crowns 300 feet above the Styx Valley of Tasmania. Some eucalypts congregate in bogs and floodplains, others are scattered like lightships, miles apart, across barren red deserts. A few compete for light and air in the tropical rainforest while still others struggle with snow and icy winds on alpine slopes.

The eucalypts show a horticultural diversity as well. Among them are dozens of shade and street trees, screening plants,

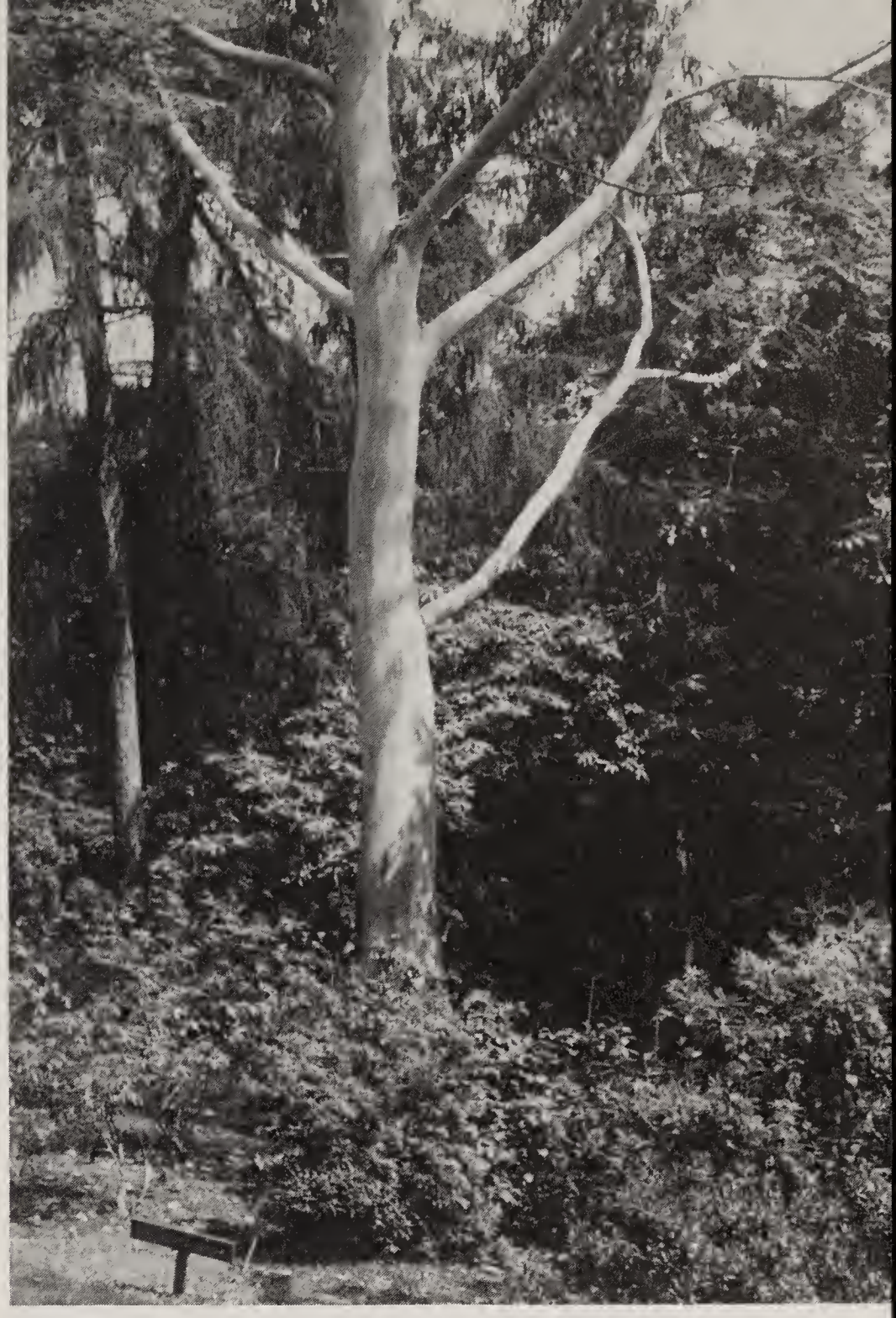
groundcovers and flowering trees. The blue-green foliage is the attraction on many, while others feature beautifully colored bark. All have a casual grace that has won them many champions.

California is home base for *Eucalyptus* in this country. Much of that state would be unrecognizable without the eucalypts that mark so many roadways, windbreaks and parks there. But among the hardier species are some that will grow wherever temperatures stay above 10° F and a few species that have survived 0° F.

The interest in *Eucalyptus* in the Pacific Northwest has been delayed by the fact that plants from California, mostly tender species, have been almost our only contact with the genus. When they are killed by a cold winter we dismiss the whole group as "not hardy here." But the cold-tolerant kinds from frost hollows and mountaintops have shown an ability to survive in climates like ours. Along the coast of Scotland and southern Ireland some of the more durable species have attained heights of over 100 feet and there are experimental forest plots of eucalypts in southwest England.

Hardiness records of the eucalypts are inexact and full of surprises. A certain species may shrug off a 10° F winter in one place and yet may die at 20° F in another. The most important reason for this may be the fact that if a given species grows throughout a wide range of elevations, seed from high-altitude trees produces the hardiest offspring, while seedlings from low-altitude trees will not survive cold that well. Furthermore, many growers have noticed that eucalypts raised from local seed seem hardier than those from imported seed. Attention to seed provenance and careful frost trials of seedlings should expand considerably the list of eucalypts for Northwest plantings.

The severe cold of December, 1983, which found more eucalypts in our gardens than ever before, gave us an idea of the potential of such trials. Low temperatures in the range of 0° to 15° F, in combination with dry, gusty winds, tested both native and exotic plants as they rarely



Eucalyptus dalrympleana *at Wisley. The height of this tree is about 70 feet.* *photo: Brian O. Mulligan*

are in this climate. *Eucalyptus* enthusiasts who surveyed the devastation of that spring and summer began to believe at first glance, that growing eucalypts would always be experimental in the Northwest; even some of the hardiest had been lost. But it soon became obvious that individual trees of certain species had survived, often without any obvious harm. Clearly, a selection process, particularly one using local seed where possible, could yield a number of *Eucalyptus* species hardy in this region. Unfortunately, such work has yet to be done to any great extent and the grower must gamble with what local nurseries offer. There is also the risk of hybridization of the hardier species with those that are less hardy at the nursery; this would produce unreliable seed.

To some critics, these plants, hardy or not, are alien to our temperate landscape of fir, salal and vine maple. True, the

Flowering branches of Eucalyptus perriniana *against a south wall of a house in Juanita, Washington.*
photo: Brian O. Mulligan

shockingly blue "silver dollar" foliage of many young eucalypts does not harmonize with the sober Northwest vegetation. But the adult leaves of most eucalypts are willow-like and a beautiful medium blue-green or blue-gray. The sinuous framework and decorative bark are really no more foreign than those of birch or madrona.

Perhaps the major contribution the eucalypts can make to our landscape is the addition of broadleaved evergreen trees. There has been a strange and frustrating lack of these in the Northwest, where a little foliage can offset a lot of winter grayness. The right eucalypts, along with the increasingly popular cotoneasters, magnolias and evergreen oaks, can be very handsome.

Physiology

Eucalypts have some peculiarities in common. The most striking is the change of leaf shapes they undergo with maturation. In most species, the leaves of the first few years are opposite, stalkless, usually roundish and glaucous blue. This foliage, suitable for floral arrangements, can be encouraged by heavy annual pruning. At some point, usually between eighteen months and three years, the tree begins to produce increasingly elongated, less glaucous leaves. The adult leaves are, in general, lance-shaped or sickle-shaped, alternate and glossy gray-green on both sides. There is wide variability though, and a few species, such as *Eucalyptus cinerea*, never develop a different adult foliage.

A eucalyptus flower consists of a cup covered with a lid composed of hard, green petals and sepals. This lid pops off to reveal a puff of stamens. In some tender species, notably *Eucalyptus ficifolia* and *E. calophylla*, these stamens are glowing red, pink, orange, or yellow and are spectacular. In most cool-climate species the flowers are less colorful, but, like the other species, they are attractive to honeybees. The blooms are followed by top-shaped seed capsules from which the tiny seeds can be sprinkled like pepper.

The growth rate of a eucalypt can be astounding. It is not unusual for some, even in northerly latitudes, to add eight feet a year. Five feet annually is average and this pace may continue for ten years or more. Young trees are often tall with no spread, but they eventually fill out. The 'classic' mature eucalypt, though, is slender and high-crowned.

Cultivation

In addition to all these assets, the eucalypts present few problems in cultivation. They have been imported only as seed, leaving their many pests behind. It has even been suggested that it is the absence of these ravenous insects that enables them to grow so much faster abroad than they do in their native Australia. Frost is their only enemy in our region, and will be a concern until we have more thoroughly tested and selected the hardiest species for fitness in our climate. In all but the warmest locations, eucalypts

should be used carefully so that their loss would not leave a big hole in the landscape.

Eucalypts are not particular about soil, but most species need good drainage. The exposure should be as open as possible since a eucalypt will tend to lean away from dark, encroaching vegetation. At planting time it is critically important to spread the plant's roots; a eucalypt cannot untangle them once planted and is likely to blow down. Even with proper planting, a sapling may outgrow its roots the first year and flop over. It then should be cut back to about six inches in spring or summer and the best resulting shoot selected as the new main stem. A eucalypt should not be staked as it is unlikely to outgrow its need for support, though a sprawling sapling will often right itself as its wood hardens. All in all, it is best to start with a small, un-potbound plant and, except for an occasional soaking, leave the tree to its own devices.

With a few notorious and non-hardy exceptions, eucalypts are congenial garden trees. Their leaves hang downward, casting only thin shade and their roots are rarely rampant or greedy. When used with a ground cover of drought-resistant shrubs, a eucalypt's litter, minimal in most species, will be neatly absorbed.

Local Collections

Local collections of *Eucalyptus* are few but interesting. The Washington Park Arboretum has been trying eucalypts all along, with only a handful surviving the 'test' winters. Of those that have survived, the snow gums (*Eucalyptus niphophila*), near the offices, attract the most notice. At a graceful 50 feet, they are about twice the height of their counterparts in Australia. (They had been started from seed in 1961.) Of a dozen or so species elsewhere in the Arboretum, nearly all were killed or cut to the ground in the 1983 freeze, though there is one healthy cider gum (*Eucalyptus gunnii*) in the group near the *Hamamelis* section and a small stand of young snow gums nearby. Perhaps all these trees would be stronger if the site were less shaded.

The collection around the Forest Resources complex on the University of Washington campus benefits from a warmer environment. This ever-expanding planting is one of the largest collections in the Northwest, although the freeze has drastically thinned the plantings for now. The largest trees there consist of two cider gums (*Eucalyptus gunnii*), the larger about 60 feet tall, and one specimen of *E. delegatensis*, which is nearly as tall. Other species are still recovering or not yet replaced, though several promising survivors can be seen along the Burke-Gilman Trail. (Beware, however, for the trees of this collection are not labeled.)

There is much more to learn about *Eucalyptus* in cooler regions. Even in England, where plant collecting seems to be

Eucalyptus parvifolia. *photo: Peter Ray*

in the blood, many promising eucalypts have yet to be adequately tested. Here, with our advantage of some summer heat and sushine (usually!) we have the opportunity to try more of these fascinating and useful trees.

Cold Tolerance of the Species

The following lists contain nearly all the species of *Eucalyptus* that could succeed somewhere in western Washington and Oregon. The information has been gleaned from the literature and from the experiences of eucalypt fanciers. As with any such tabulations, the information is unavoidably general. Only as more eucalypts are given a chance in this area will the data become more complete and accurate.

Eucalyptus gunnii (*syn.* archeri) *on Vashon Island.*
photo: Peter Ray

The Hardiest

These species seem to be the most cold-tolerant; they show up consistently in collections of hardy eucalypts. They are listed here in approximate order of hardiness:

Eucalyptus niphophila, snow gum. Probably the hardiest species of all, this is an alpine tree attaining 30 feet in Australia and nearly twice that in cultivation. It is outstanding for its creamy bark streaked with gray, olive, and tan, and for its glaucous foliage. Slower growing than most, it is still the most reliable species for colder areas; it endures near 0° F temperatures when established.

Eucalyptus gunnii (synonym: *E. archeri*), cider gum. Also famous for hardiness, in our area this species is not always as reliable as the snow gum. Some trees survive 0° - 5° F while others will be dead at 10° F. A rather fast-growing species, it reaches 40 - 60 feet in ten years in Seattle, and has matured at 80 - 100 feet in Britain. The juvenile foliage is the 'silver dollar' type and is very glaucous; older trees have fine, blue-gray foliage on a dense, handsome framework.

Eucalyptus parvifolia, small-leaved gum. This rather dense, shrubby tree (to 30 feet) has small blue-green leaves that change little from juvenile to adult form. Cut to the ground by the 1955 freeze and also in 1968-'69, it has recovered and has been relatively happy in the Arboretum since then. It could serve as interesting screening material in mild locations.

Eucalyptus perriniana, spinning gum. A small glaucous tree seldom over 20 feet tall, this species takes its name from its circular juvenile leaves, which spin around the twig when dry. These give way to willow-like, gray-green adult foliage on a spare, slender framework. The plant is useful for cut foliage, and is pleasant in clusters or as an espalier. While reported hardiness figures range from 0° - 15° F, trees from local seed were virtually untouched by the vicious cold of last December, though other trees had light to severe damage.

Eucalyptus mitchelliana, weeping Sally. This is another alpine species grow-

ing moderately fast to about 50 feet. It has a light crown of slender blue-green leaves on drooping red twigs. It appears to be very hardy and vigorous, though there were some surprising losses and setbacks in the 1983 freeze - the specimen near the Arboretum office was killed. With a little more testing, this graceful tree will probably show up as one of the best for our area, though so far it is rarely grown.

Other Hardy Species

These eucalypts also are noted for hardiness. They have grown well in the Northwest, the British Isles and similar zones, though there are very few existing specimens in our area. Some may belong on the first list, others may only succeed in the warmest coastal locations; only further testing will prove their place. The list is alphabetical only.

Eucalyptus coccifera, Tasmanian snow gum. This is a plant of many forms and habitats, and only the high-elevation type is especially hardy. These are small- to medium-sized trees with oval to triangular blue-green leaves densely set on red twigs. While the trees mature to a very wide-brimmed outline in Australia, they seem narrower in cultivation.

Eucalyptus cordata, heart-leaved gum. Both juvenile and adult leaves of this tall tree are long, triangular, stalkless and intensely blue-white. It is a very fast-growing species, said to be hardy below 10° F, though not yet proven so here.

Eucalyptus dalrympleana, Dalrymple's gum. This is one of the largest; it is tall and slender, with willowy gray-green leaves. Its airy crown and peeling white bark are striking. Withstanding heavy snows and long, freezing winters in its native habitats, this is one of the most reliable in cooler climates, though not yet successful in the Northwest.

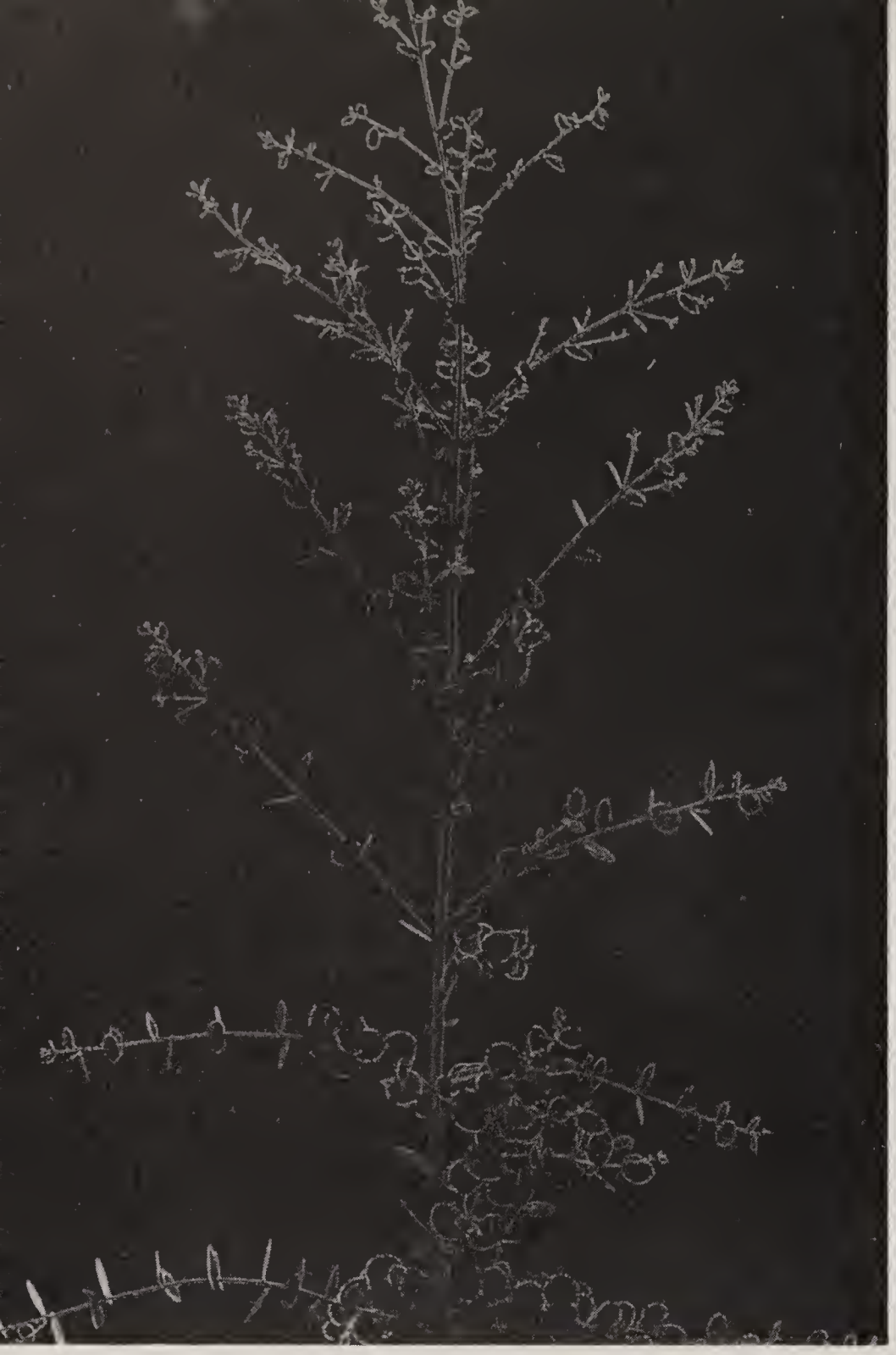
Eucalyptus delegatensis, stringybark ash. Another giant from cold mountain zones, this one has done well in a few places in Seattle, but some older trees were killed in December, 1983. Seedling

Eucalyptus perriniana *on Vashon Island.*
photo: Peter Ray

selection should yield plants hardy to 5° - 10° F. Its large, pendulous leaves are dark blue-green, the bark is reddish to cream and peeling.

Eucalyptus glaucescens, Tingiringi gum. This is a slender, very silvery-colored tree which grows quickly to over 100 feet. Its narrow leaves are graceful in the wind. Rarely tried here, and then not very successfully, it is thought to be hardy nearly to 0° F by some British enthusiasts.

Eucalyptus johnstonii, yellow gum. A large tree with richly dark-green foliage, the yellow gum is interesting for its completely non-glaucous coloring. Its juvenile leaves are rounded, the adult ones narrow. They unfold revealing a coppery-orange color. While it has easily survived temperatures in the low teens, it fared poorly this past December - the specimens in the Arboretum were killed. Such a pleasant and promising tree deserves more testing.



Eucalyptus gunnii. *The juvenile foliage.*
photo: Peter Ray

Eucalyptus neglecta, Omeo gum. This large tree grows in cold, wet soils. It displays roundish foliage that suggests aspen. The bark, though, is gray-brown, the foliage gray-green. An attractive species of exceptional moisture tolerance, the Omeo gum shows the potential of being one of the hardiest.

Eucalyptus nitens, silvertop. A tall, exceptionally robust tree, this is a hardier relative of the giant blue gum of California landscapes. Its triangular, silvery-green juvenile leaves give way to long, shiny sickle-blades on a sturdy frame that may add ten feet annually. Before the recent freeze, this was the most exciting prospect of the many eucalypts that the nursery with which I was associated had tried. Our first crop of seedlings had reached 30-40 feet in various Seattle-area locations only to be killed by the cold; but they had all previously survived 10° - 15° F with little or no damage, and a few seedlings of a new seed lot came through the December cold intact. Unfortunately the specimens in the Arboretum did not survive. The enthusiastic notes of some growers in Europe gives hope that some hardier strains of this striking tree will be found.

Eucalyptus pauciflora and *E. debeuzevillei*, snow gums. These are the two other members of a confusing trio that includes *E. niphophila*. Many experts include all three under *E. pauciflora*. That species is a wide-ranging one, taller than *E. niphophila*, red-twigged rather than white, and often less hardy. *Eucalyptus debeuzevillei* is intermediate in hardiness (though reportedly equal to *E. niphophila* in December, 1983) and is said to be a large tree. It has longer, narrower, less glaucous leaves. This one would appear to be a very good eucalypt for the Northwest, but rarely has been planted.

Eucalyptus stellulata, black Sally. Another tree from wet frost hollows, this species is like a multi-stemmed willow, reaching about 50 feet. Its gray-green to sea-green leaves make an airy, low-branching crown. It seems to take heavy, wet soils as well as dry conditions. This tree took light damage at 10° F in 1978, but was mostly killed to the ground last winter.

E. urnigera, urn gum. This is a relative of *E. gunnii* and *E. johnstonii* and is intermediate. Its large, round juvenile leaves are glaucous, while the long-pointed adult ones are dark gray-green. A large tree, usually tolerating temperatures in the range of 5° - 10° F, the urn gum came through the recent freeze fairly well in most cases, but did not survive in the Arboretum.

E. vernicosa, varnish-leaf gum. A scrubby tree or shrub seldom over fifteen feet tall, this species is mentioned for its hardiness rather than for its ornamental qualities. Its thin foliage is a dark, shiny green.

E. whittinghamensis. This large and vigorous tree arose from a chance cross of *Eucalyptus gunnii* and *E. urnigera* in a British garden a century ago. Plants from the original tree, which reproduces true from seed, are growing all over Britain and

Eucalyptus niphophila *on Vashon Island.* *photo: Peter Ray*

there is a 'forest' of them over 100 feet tall in Scotland. Though apparently untried here, this tree would seem to be a eucalypt of great potential that deserves some testing.

Editor's note: There is some controversy about the origin of E. whittinghamensis. *Brian Mulligan's research has revealed that this tree was raised from seed brought back to Scotland from Tasmania in 1846.*

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July 1, 1983 - June 30, 1984

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Spring Wildflowers of Western Australia

JOSEPH W. MILLER

On a previous holiday in Australia, we participated in a "coach-camping" trip through the states of Northern Territory and South Australia. This had given us tantalizing glimpses of the continent's unique flora, but it was too late in the spring for most wildflowers in the arid Red Center and too early for them on our drive along the southeast coast from Melbourne to Sydney. Another trip was called for, and we would try to schedule it during what we hoped would be the peak of flowering.

Of any part of this great island-continent the South West division of Western Australia is most noted for its floral diversity. From the earliest days of European settlement, the plants of this remote region have stimulated great interest among botanists and horticulturists. Early botanists traveled and collected extensively through the Swan River Colony after its establishment in 1829, and the area became known among scientists as the home of some of the most unusual wildflowers. Director Sir W. J. Hooker, commenting on a collection sent back by James Drummond in the 1840's to the Royal Botanic Gardens at Kew, wrote that he had "rarely seen so great a number of fine and remarkable species arrive at any one time from any country."

The huge state of Western Australia comprises approximately a third of the continent. It is surrounded on three sides (south, west and north) by ocean and on the fourth side by desert. These barriers have proven impenetrable to most species of plant which might otherwise have colonized this area of some 2.5 million square kilometers. Geologically, the South West is the oldest part of the Australian land mass, and while other parts of the continent have undergone radical changes in climate, and even submergence beneath the sea, this area has remained relatively untouched for millions of years. Consequently, the flora of the South West has a higher proportion of endemics (plants

that grow naturally in a region) and a greater number of species than anywhere else on the continent.

The flora of Australia has long been noted for its diversity, no other country having more genera and species peculiar to its own boundaries and fewer plants of other parts of the world. With the exception of two small families, all Australian plants belong to families found elsewhere on the globe, particularly in those parts of the Southern Hemisphere that we now know were parts of the ancient proto-continent Gondwanaland.

In planning our 1983 Australian holiday, we found several references to the spring wildflower tours conducted by Westrail (Western Australian Railways) out of Perth. The tours for the spring of 1983 began in late August with excursions north of Perth and in early October with trips to the south. The latter seemed to us from the descriptions in the promotional material to offer more opportunities to visit National Parks and forested areas, and we booked reservations on the first southern tour leaving Perth on October 5th.

On the last day of September we debarked from our long trans-Pacific flight at Sydney for a couple of days of recovery from jet-lag. Sydney is an exciting city, with the world's most beautiful harbor, but hardly a place to enjoy Australian flora. Even the famous Royal Botanic Gardens emphasize European, Asiatic and American species in the plantings, although they contain a number of flowering shrubs and trees from Australia.

For the plant enthusiast whose brief visit to Australia is limited to Sydney, we can recommend a delightful area with an outstanding collection of native flora. North of Sydney, in the suburb of St. Ives, is the Ku-ring-gai Wildflower Garden, a 123.5 hectare (305 acre) sanctuary. It is specifically reserved for the study and protection of Australian flora. On the train to the garden we marvelled at the beautiful landscaping (mostly azaleas and bedding plants at this season) in the numerous stations. It seems each stationmaster competes to see who can create the most

Hakea victoriae. *photo: Joseph Miller*

spectacular setting, with stunning results.

Ku-ring-gai Wildflower Garden is a walking park, visitors being required to leave their cars a few hundred meters from the gate. Most of the area is in untouched native bush, at this time blooming with many understory plants of New South Wales. However, one site, The Knoll, is a large landscaped area with an extensive collection of plants from various parts of the continent. Here we were fortunate to meet the ranger, with two volunteers who were spending their Saturday weeding and grooming the site. When they heard where we were from and that we were headed to Perth for a spring wildflower tour, we received an enthusiastic tour of the collection. We saw here a number of well-grown plantings of West Australian wildflowers that we would later see in their native habitats.

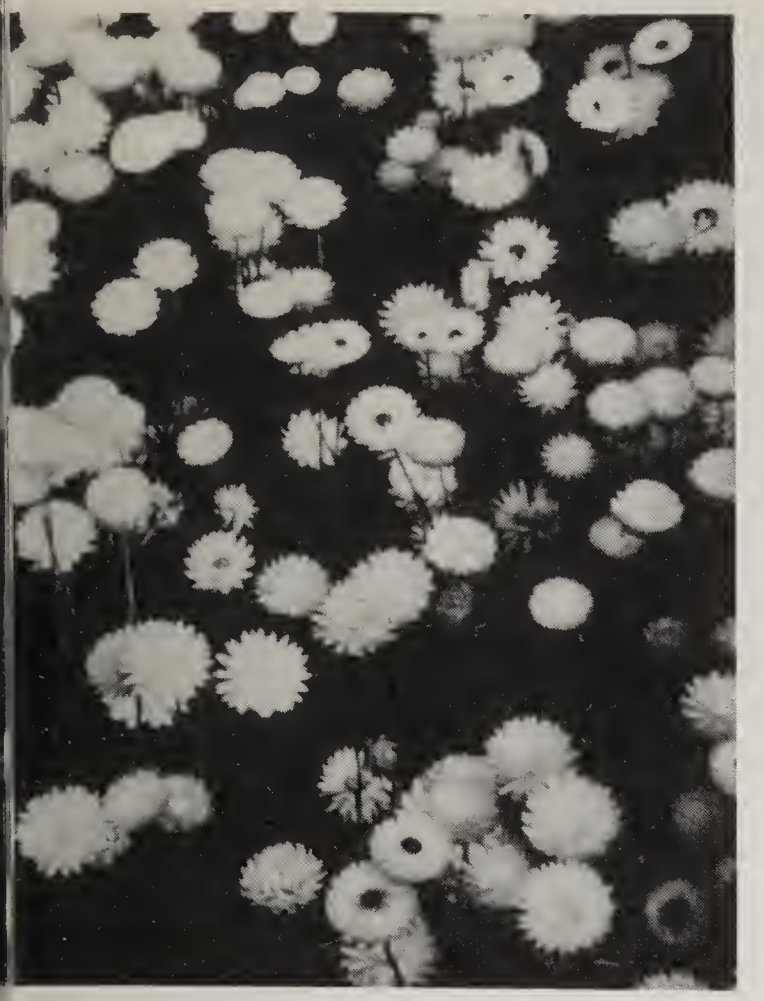
A long hop of 3,315 kilometers brought us to Perth, capital and largest city of Western Australia. This city seems to have been

designed for people rather than for automobiles, a factor that makes it very pleasant for the visitors. Its city fathers had the foresight to set aside in public ownership all the lands bordering the wide Swan River, which meanders through the city. These strips of land provide parkland and open space for the 900,000 inhabitants.

The feature of Perth we were most anxious to visit was the 404 hectare (998 acre) King's Park, noted for its spring displays of wildflowers. We set out to spend the day there early in the morning following our arrival. The wildflowers were living up to their reputation, and we wandered happily through the bushlands, burning film as though there were no tomorrow and exclaiming over the vast expanses of pink and yellow everlastings (*Helipterum* and *Helichrysum spp.)* and the Kangaroo Paws *(Anigozanthus spp.)*. By a most serendipitous coincidence, we came upon a huge blue tent set up in an open area and learned we had been lucky enough to visit Perth at the time of the Native Plant Display and Wildflower Exhibition. This annual event, held the first weekend in October, is sponsored by the Western Australian Wildflower Society and by the nurserymen who specialize in native plants.

Inside the tent and protected from the bright West Australian sun were extensive displays of cut wildflowers, interpretive displays on propagation and cultivation, and booths at which Society members sold wildflower seeds, notecards, posters and other floral art and literature. And, of course, there was that *sine qua non* of all Australian public functions: Devonshire teas. After succumbing to this lure, we explored the area outside the tent. Here the participating nurserymen had set up spectacular landscape displays of blooming wildflowers, and swarms of Australians were circulating through the plantings, taking pictures and making notes.

After the splendor of the exhibition, we expected the rest of King's Park to be anticlimactic, but such was not the case. As long as our feet held out, we explored the Nature Trail and the 12 hectare Botanic Garden. The latter had sections devoted to



upper left: a field of everlastings, Helipterum roseum.
upper right: The Gloucester tree. Left: White spider orchid, Caladenia patersonii *var.* longicauda.

photos: Joseph Miller

Darwinia meeboldii, *Cranbrook bell.*
photo: Joseph Miller

Mediterranean, South African and Californian plants, but we concentrated on the huge collection of West Australian flora.

After a few more pleasant days in Perth we met our wildflower tour bus. We were the only Americans in the group, which included a Canadian couple from Vancouver, four ladies from New Zealand and two from Singapore. The rest of the forty posy-seekers were Australians, most from the eastern states.

Ray Hebbard, our jovial "coach captain" (whose Australian accent took a bit of getting used to) and Gladys Walker, our botanist, explained the rules of the tour as our bus barrelled south along the Indian Ocean. We would rotate our seats in the coach twice a day so that everyone would have equal access to the choicer front seats. There would be no smoking on the bus—a most welcome change from our last year's coach-camping trip.

Glad explained that in the state of Western Australia *all* wildflowers of certain areas were protected; i.e. all crown lands, state forests, lands reserved for public purposes, and every roadside in the South West division of the state. We were to look, admire and photograph only—no picking. However, the Conservator of Forests had granted permission to the botanist accompanying wildflower tours to pick herbarium specimens for each of the passengers to press in specimen booklets which Glad passed out to all of us.

There are about 7,000 species of flowering plants occurring naturally in Western Australia. Of these, 3,600 occur in the South West botanic province and 2,400 are endemics. Naturally, in a six-day tour, we could hope to see only a minute proportion of these, but our driver and botanist labored valiantly to show us a representative sample. Days were long, and we seldom arrived at our night's lodging before six or seven. Both Ray and Glad were familiar with the region in which we were traveling, but this was the first southern tour of the season, and a certain amount of exploration was required to find blooming colonies of some of the more famous and spectacular species.

Much of the 1,500 kilometers we covered was on unpaved roads, especially through the several National Parks. A typical flower stop would begin with Glad spotting something through the bus window and yelling at Ray to stop. Ray would make some wisecrack and pull the bus over, backing up if necessary. The door would open and 40 plant-nuts would pour off, and spread out over the landscape, cameras at the ready. Glad and Georgie, our hostess, would pick samples of some of the more common species and put them in a plastic garbage bag. When there had been ample time for photography, we would board the coach and Georgie would pass out to the passengers examples of the plants collected for mounting in our specimen books with "sticky tape." Later Glad would pass back through the bus her cards with each plant mounted, its botanical name, common name, if any, and family name so that we could copy this information onto our cards.

I do not normally approve of the practice of "hay-baling," but the flowers were in such profusion that the relatively small quantities our botanist collected appeared to have no ecological impact. She collected no orchids and none of the rarer

species, and I did find the collection useful later in identifying my slides.

It is difficult to pick out highlights of the hundreds of species we saw. Probably to us the orchids were the outstanding plants of the trip, although they had to be hunted for and did not constitute great swatches of color like some of the flashier species. There are 25 genera of Orchidaceae and 150 species in Western Australia, three-quarters of which are endemic. All of those in the South West are ground dwellers, and many which we saw were extremely photogenic. I blessed my macro lens!

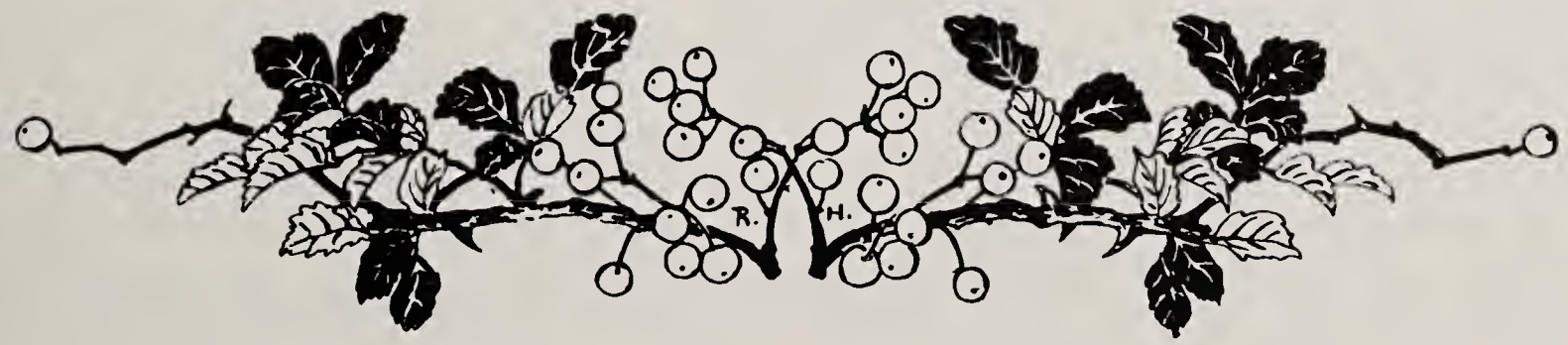
At home sundews have always held pride of place in our affections, but we had never dreamed of *Drosera* like those we saw in Australia. Of the 80 species in the world, 46 occur in Western Australia, and some of those we saw had brilliant orange or pink flowers. We even saw climbing sundews!

Another high point of the trip was a visit to the Karri Kingdom in Warren National Park, home of Australia's tallest trees, the karri or *Eucalyptus diversicolor*. The tallest known example of these beautifully columnar giants was measured at 90 meters (295 feet) with a girth of 7.3 meters (24 feet). A personal thrill was being able to climb the famous Gloucester Tree, a 61 meter (200 feet) fire look-out. This karri had been made into a look-out by driving steel spikes into its trunk in a spiral pattern. It was not a very difficult climb, but I would not recommend it for acrophobiacs. One elderly lady on our tour gave me the ultimate Australian accolade when I reached the ground: "Good on yer, myte!"

The most spectacular plants we saw were probably of the Goodeniaceae family, with their smashing red and blue Leschenaultias and purple Dampieras, the red, yellow and pink Verticordias or feather-flowers of the same family as the Eucalypts, Myrtaceae, and the gold and orange Hibbertias of the Dilleniaceae family. But for unusual form of flower and foliage, probably nothing we saw compared with the members of the Proteaceae family, the *Banksia* species.

A gastronomic as well as floral highlight occurred when we reached Cranbrook, a small agricultural town near the border of Stirling Range National Park. We had hit the weekend of the Cranbrook Wildflower Display, a mecca for flower lovers put on by the local branch of the Western Australia Wildflower Society. Here we saw among many gorgeous things a blossom of the famous Cranbrook Bell, *Darwinia meeboldii,* one of the rarest wildflowers of the state. But flowers were almost forgotten on the repast of tea, scones and wildflower honey.

The tour was over too soon and we found ourselves back in Perth to continue our Australian holiday, which included visits to Brisbane and Townsville in the tropical northeast and a stay on Heron Island on the Great Barrier Reef. We were to see many interesting things but nothing to top the wildflowers of Western Australia at the peak of their spring bloom. If we were to do the holiday over, the only change we would have made would have been to schedule one of the northern tours from Perth as well as the one to the south. But what would we have done with another hundred wildflower slides?



THE ARBORETUM FOUNDATION

STATEMENT OF CASH RECEIPTS, DISBURSEMENTS AND CHANGES IN CASH BALANCES

(With comparative totals for 1983)

	Year ended April 30, 1984					Year ended April 30, 1983
	Unrestricted	Restricted	Building Fund	Endowment Trust Fund (Note 3)	Total all funds	Total all funds
Receipts:						
Dues	$ 49,972				$ 49,972	$ 41,702
Donations	3,769				3,769	4,485
Japanese Garden		$ 5,025			5,025	5,145
Unit Council -						
Plant and bulb sales	81,629				81,629	82,133
Other	7,506				7,506	9,209
Interest on savings and investments	37,528	3,244	$ 22,835		63,607	103,205
Income from investment trust				$ 2,143	2,143	2,118
Advertising and miscellaneous	4,169	7,664	100		11,933	9,426
	184,573	15,933	22,935	2,143	225,584	257,423
Disbursements:						
Salaries and wages	29,030				29,030	27,520
Payroll taxes and benefits	7,308				7,308	6,907
Bulletin	26,522				26,522	32,556
Publicity	5,338				5,338	7,211
New visitor center (Note 4)			17,007		17,007	3,489
Other operating expenses	28,155			425	28,580	16,868
Japanese Garden		517			517	5,463
Unit Council-						
Plant and bulb sale costs	40,998				40,998	43,164
Utilities, supplies and postage	8,048				8,048	8,029
Donations to University of Washington Arboretum	50,619				50,619	74,327
Payment for partial support of the Office of the Director of Arboreta (Note 4)	15,000				15,000	15,000
	211,018	517	17,007	425	228,967	240,534
Excess (deficiency) of receipts over disbursements	(26,445)	15,416	5,928	1,718	(3,383)	16,889
Cash balance, including short-term investments (Note 1):						
Beginning of year	506,886	26,146	285,942	3,557	822,531	805,642
End of year	$ 480,441	$ 41,562	$ 291,870	$ 5,275	$ 819,148	$ 822,531

Joseph A. Witt Memorial Fund

Additional donations by members and units of the Arboretum Foundation.

Unit #35
Joan G. Logan
Mr. & Mrs. Leonard B. Lockett
Caroline P. Johnson
Cynthia Lee Clarke
M. Takahashi
Mr. & Mrs. W.E. Williams
Unit #10
Unit #41
Unit #38
Mr. & Mrs. Roger Spurr
Unit #15
Dorothy M. Metheny
Tacoma Garden Club
Mrs. Charles K. Moore
Colonel & Mrs. L.P. Collins, Jr.
Unit #7
Chloe Sivertz
Lucy Van B. Mitchell
Mr. & Mrs. James A. Curry
Unit #39

Donation from the Arboretum Foundation to the University of Washington Center for Urban Horticulture

July 1, 1983 — June 30, 1984

Arboretum Awareness	$ 1,487.16
Horticulture Affair	58.78
Joe Witt Memorial	1,038.15
Bulb sale profits	9,000.00
Plant sale profits	35,000.00
Unit donations	409.00
	$46,993.69

This total is not in addition to the $50,619 which appears on the Arboretum Foundation audit, page 18.

James Fukuda

In November, the Arboretum and particularly the Japanese Garden lost a faithful friend. Jim Fukuda was one of those little men who didn't stand tall in a crowd, but who stood sky high in ability and good will. He was invaluable in his work with our Japanese Garden from its inception until the day he passed away. He was our interpreter when Japanese visitors of some importance came to view our authentic garden and our savior when Mr. Iida came here to build it. He was our guardian angel and our watchdog for its use. His understanding of protocol and Japanese customs steered us in the right direction on countless instances of dealing with problems. He will be sorely missed.

—KENNETH W. SORRELLS

Recovery from Winter Damage

BRIAN O. MULLIGAN

During the summer and fall of 1984 observations were made on those plants noted as damaged by the cold weather of December, 1983, and reported on briefly in the *Bulletin*, vol. 46, no. 3, (Fall, 1983).

Some of those genera which suffered most severely included *Eucalyptus, Ceanothus, Cistus* (especially the young plants), *Erica* (certain species only), and the large-leaved rhododendrons of the subsections Falconera and Grandia.

Most of the *Eucalyptus* trees were killed to the ground. Included in this group were *E. perriniana* (planted 1969)*, *E. gunnii* (1981), *E. moorei* (1966, but cut back in 1968-1969). Also killed were species which have responded after previous winter damage — *E. pauciflora* (1965), originally killed in 1971-1972 and *E. niphophila*. In the latter case, five trees were not injured; two located at the east end of the office parking area and three found in the *Hypericum* collection. The elegant *E. mitchelliana* (1974), which was 30 feet tall and located by the entrance to the office was killed outright. This is a particularly regrettable loss since this is a rare as well as a beautiful tree. The others are now all producing strong new shoots from the base of the trunks. One surprising exception to this general slaughter was a young plant of *E. gunnii,* which was planted at the end of August, 1983; located in the *Ceanothus* collection beside Azalea Way, this specimen came through the ordeal unharmed. The source of its seed is unknown, having been a gift to the Arboretum.

Most of the *Ceanothus* were old plants which were either badly burned by the cold wind or else entirely killed. *C. thyrsiflorus* was in both categories. Other plants which were damaged but are now recovering include *C. foliosus, C. griseus* (1956), *C. sorediatus* (1969), and the selection of *C. gloriosus* var. *exaltatus* named 'Emily Brown' (1969); also the hybrid 'Southmead' located against the south wall of the west greenhouse (1972).

All young plants of *Cistus* set out in recent years were killed but older plants survived although they were sometimes damaged. The hybrid 'Doris Hibberson' (1966) was among the latter. In this same area the true bay trees, *Laurus nobilis,* suffered severe foliage burn and some

** Planting dates in parentheses.*

branches were killed. All plants of the French lavender *Lavandula stoechas* (1980) were killed in the bay tree area, save one. These lavender plants have suffered in previous cold winters but have always grown up again. Also lost here were two plants out of three of the hybrid *Cytisus* 'Porlock'. The *Carpentaria californica* plants came through once again, although rather severely burned by the winds (this also was the case with the plant situated at the west end of the greenhouses). Amongst the hebes in the borders beside Arboretum Drive the mat-forming hybrid 'Carl Teschner' (1975), suffered from wind burn at the north end of the planting, whereas most of the others weathered the storm very well.

On the banks beside the parking areas at the head of Rhododendron Glen our sole tree of the evergreen *Acer oblongum* was defoliated, not for the first time, but by September had produced healthy new growths all over it. In 1968-1969 it was killed to the ground, but recovered and flowered for the first time ten years later. No viable seeds have been produced. Close to it a large old plant of *Pieris formosa* beneath a Douglas fir suffered only dieback of young shoots. The glossy-leaved *Viburnum odoratissimum* had scarcely any noticeable damage. This is evidently a hardier shrub than we had suspected from its appearance, at least when situated in a sheltered site with good soil drainage. One clone of *Viburnum tinus,* originally from Algeria, lost all its new growths. A few yards to the south, however, several plants of *Viburnum atrocyaneum,* a native of Assam and northwest Burma, which grows at an elevation of 7,000 feet, were very severely hurt, losing all of their evergreen foliage and having to be cut back drastically in order to recover. These were planted in 1972. Older plants of the related *V. propinquum* in an almost adjoining area came through unscathed.

At the south end of Arboretum Drive, near the rock garden, the upper shoots of *Garrya elliptica* were killed, but not the neighboring plants of the hybrid *G.* x *issaquahensis,* whose other parent, *G. fremontii,* evidently conferred additional hardiness on it. Of the manzanitas here, *Arctostaphylos manzanita* subsp. *laevigata* (1967) was severely damaged, losing a number of its branches. However, *A. manzanita* itself, on the bank facing Lake Washington Boulevard, was little affected. The selected clone of *A. stanfordiana* subsp. *bakeri,* named 'Louis Edmunds', at the foot of the bank near the garryas, had more young shoots killed but is recovering. Likewise the clone 'Trinity', of similar age.

Inflorescence of Vitex agnus-castus *on a plant behind the south greenhouse at the Arboretum. This plant has since sprouted 1½ feet from the base and bloomed.* *photo: B.O. Mulligan*

Rhododendrons

Many of the large leaved rhododendrons suffered very severely, as one might expect from previous experiences, despite their location on a steep hillside and with some protection from surrounding native trees. Amongst the worst

Garrya *x* issaquahensis *flowering on the fence west of the greenhouse.* *photo: B.O. Mulligan*

affected were *R. praestans, R. grande,* and *R. macabeanum;* all were either killed or are making very little new growth. Somewhat better were *R. basilicum, R. eximium,* and *R. falconeri.* Least affected and making the greatest amount of new growth were *R. rex* and its subsp. *arizelum,* and *R. montroseanum.* Most of these are plants 3-5 feet in height and are of various ages. Some were planted April, 1980, while others only in March, 1983.

Oaks

Amongst the evergreen Asiatic oaks and their near relatives in the genera *Pasania* and *Lithocarpus* only *Quercus gilva* suffered noticeable damage, with all our plants losing most of their leaves and some young growths of 1983. However, by September new shoots and leaves were well developed on all three plants. The old tree of *Q. glauca* near the north gate shed lost about two-thirds of its foliage but by September was again fully covered. *Q. myrsinifolia* and *Q. sessilifolia,* which originated in the same regions, came through in excellent condition in the Japanese garden. The Mexican and southwestern United States species *Q. arizonica* was completely defoliated, as was *Q. rugosa.* One tree of *Q. dumosa* was partially defoliated. These were all planted in 1974. By September and October of this year all of these oaks had made ample new growth. Three undamaged species were *Q. chrysolepis, Q. emoryi* from New Mexico (1959), and *Q. turbinella* from Arizona (1974). This suggests that species from the southern Rocky Mountains are normally quite hardy here and will tolerate a good deal of cold weather if placed in a suitable site.

Heathers

Of the tree types of heathers the large old plants of *Erica arborea* var. *alpina* were unharmed, as usual, and plants believed to be the hybrid *E.* x *veitchii* were also not damaged. However, the last two plants of the Portuguese *E. lusitanica* were killed, but were in a weak state prior to December last. We had no plants of *E. australis* remaining then, excepting one old specimen of the white flowered form, 'Mr. Robert', in poor condition. This plant is still alive, but barely so. *Erica scoparia,* the besom heath, planted in 1952 on the rock garden is dead to the ground but producing new growths. *E. terminalis,* the Corsican heather, suffered no damage on the top of the rock garden, but in Rhododendron Glen lost some branches and had to be pruned back to force new growths (this site faces north). Among the smaller types *E. erigena (mediterranea)* 'Maxima' near Azalea Way was killed entirely, but specimens on the bank by the parking area at the head of Rhododendron Glen

were merely killed to the ground. The white form of *E. erigena,* planted in the new bed of heathers in the Glen in October, 1980, was also killed to the ground but is making good new growth. In this same location the following clones of the bell heather, *E. cinerea,* were killed: 'Colligan Bridge', 'Joyce Burfitt', and 'Rose Queen'. *Calluna vulgaris* 'Multicolor' was seriously burned and discolored.

Plants Around the Greenhouses

Some old specimens on the south side of the greenhouses were severely damaged by this cold spell and had to be pruned back hard in the spring to rejuvenate. Amongst them were the uncommon Australian shrub *Bursaria spinosa,* planted 1965, which is valued for its profusion of white flowers in summer, and the handsome purple-spiked chaste tree, *Vitex agnus-castus* which flowers in September. The Californian tree-poppy, *Dendromecon rigidum* (1965), was killed to the ground but flowered again on shoots three feet tall in September. An Australian bottle-brush, *Callistemon linearis,* was killed to the ground, and *Rhaphiolepis indica* (1957) at the west end of the houses was severely damaged. However, the brilliant double flowered pomegranate, *Punica granatum* 'Pleniflora', survived with only a few young shoots killed and flowered as usual in August.

Viburnum lantana. *This hearty viburnum was* not *damaged in the freeze.*

URBAN HORTICULTURE ARBORETUM COURSES

THE CENTER FOR URBAN HORTICULTURE

SPRING 1985

Basic Landscape Design for Homeowners
Instructor: Scott Pascoe
Tuesdays, April 9, 16, and 23, 7–9 p.m.
$20.

Bonsai for Beginners and Intermediates
Instructor: Jane Nelson
Saturdays, April 13, 20, 27, May 4, 11, and 18, 10 a.m.–Noon. $35.

Native Trees and Shrubs
Instructor: Gillian Lewis
Saturdays, April 13, 20, 27, and May 4, 10 a.m.–Noon. $24.

Spring Lawn Care
Instructor: Walter Bubelis
Wednesday, April 17, 7–8:30 p.m. and Saturday, April 20, 9 a.m.–Noon. $15.

Getting Into Shape with Landscape Plants
Instructors: Clayton Antieau and Peggy Gaynor
Thursday, April 25, 7–9 p.m. and Saturday, April 27, 9 a.m.–Noon. $15.

Portland Garden and Nursery Tour
Tour Leader: Van Bobbitt
Saturday, May 4, 8 a.m. through Sunday, May 5, 7 p.m. $80, includes lodging and transportation.

An Introduction to the Rock Garden
Instructors: Steve Doonan and Phil Pearson
Wednesdays, May 8, 15, 22, and 29, 7–9 p.m. $24.

Spring Plant Photography
Instructor: Bernard Nist
Thursday, May 9, 7–9 p.m., Saturday, May 11, 10 a.m.–Noon, and Thursday, May 23, 7–9 p.m. $20.

Exploring an English Garden
Instructor: Martin Walters
Saturday, May 11, 9 a.m.–2 p.m. $15.

Spring Wildflowers of Eastern Washington
Tour Leaders: Jan and Giacomo Pirzio-Biroli
Thursday, May 16, 7–9 p.m. and Saturday, May 18, 7:30 a.m. through Sunday, May 19, 6:30 p.m. $45.

Softwood Cuttings
Instructor: Doug Ewing
Tuesday and Thursday, May 21 and 23, 7–9 p.m. $20.

Japanese Pruning
Instructor: David Barnhill
Tuesday, May 28, 7–9 p.m., Saturday, June 1, 8–10 a.m., and Saturday, June 8, 9 a.m.–Noon. $30.

Old European and Asian Roses: Their History and Culture
Instructor: Mike Darlow
Tuesday and Thursday, June 18 and 20, 7–9 p.m. and Saturday, June 22, 9 a.m.–1 p.m. $24.

FOR COURSE DESCRIPTIONS AND INFORMATION: 545-8033
TO REGISTER: Preregistration is required at least one week prior to first class meeting. Send check with name, address, and daytime telephone number to Urban Horticulture Courses, GF–15, University of Washington, Seattle, WA 98195. Make checks payable to the University of Washington. Bank cards not accepted.

Book Review

THE COMPLETE SHADE GARDENER, by George Schenk. Houghton Mifflin Company, Boston, 1984. 278 pages. 98 photographs, 16 in color. Price $24.95.

I have owned and valued for many years George Schenk's book *Rock Gardens,* which was published in 1964. Therefore, I was eager to have his new book on shade gardening, and well before I had finished the first chapter I was hooked. I read through to the end as if the book were a novel instead of a horticultural guide for my reference shelves. This rapt behavior was due to the content (which answered some previously unanswered questions) and also to the engaging and highly original style of the writer.

Chapter 1 describes the transformation of a bleak and cheerless walled terrace into a delightful garden retreat; one rich in its variety of shapes, colors and textures — a living work of art. The narrative of how this was done is intriguing; starting with the impulsive "Today, this very morning, I would landscape the north wall bed...[and then] I would have time to plant the bed before sundown," and continuing for several *seasons* in 17 pages of text and pictures, through obstacles and solutions, choices and rejections, trials and improvements, until the terrace had become a very special garden. A true story, and a charmingly taught mini-course in garden design.

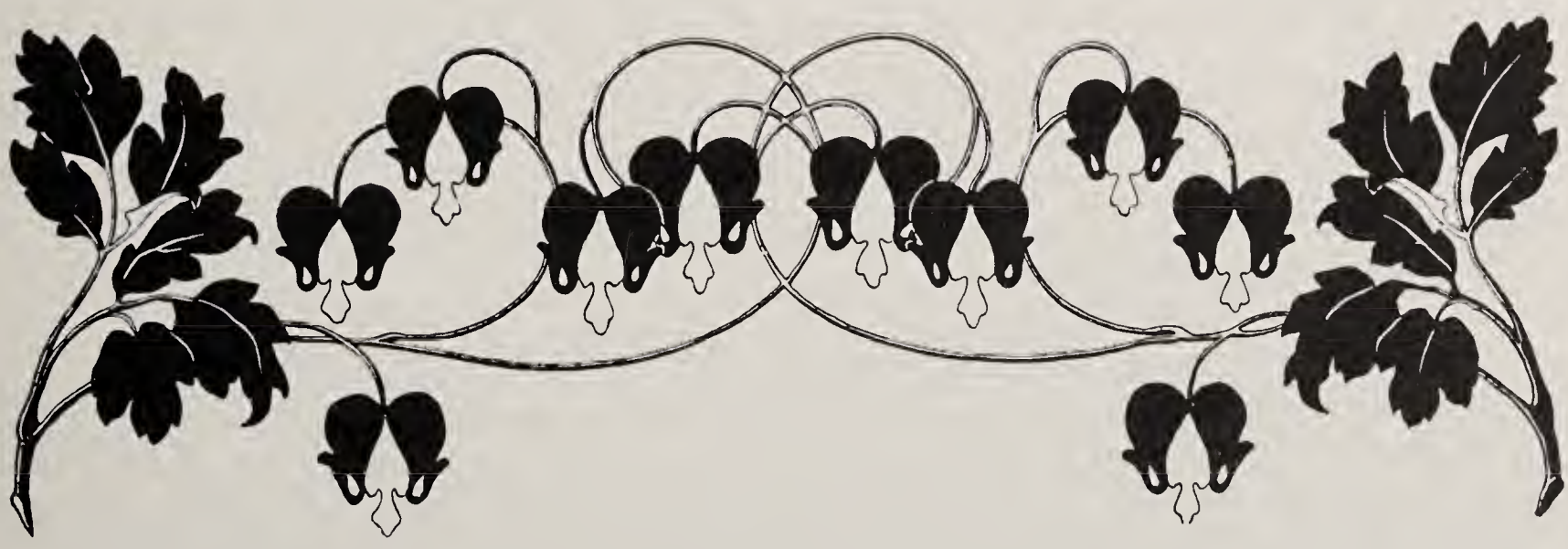
The description of the author's creative process is followed by a series of chapters on the fundamentals of gardening. This includes excellent, detailed, and practical suggestions on every aspect of gardening in the shade; from site and soil preparation to planting, pruning, pests, and seasonal changes. Various types of shade are delineated and discussed. A recipe for ideal garden soil for shaded areas is given and thereafter called for, from time to time, like all-purpose flour in a cookbook. Lists of plants that are usually slug-proof, and those that are usually slug-relished, can be used as a guide, and added to and revised by experience. Altogether this how-to section seems the most valuable to me because it provides labor-saving ideas and other information which I wish I had had long ago. It encouraged me to see with new eyes what is on my own site.

In Part II, plants for all climates are listed and are separated by types. Over 600 trees, shrubs, groundcovers, vines, ferns, perennials and annuals are included. They are keyed to the areas where they can be grown, with generous comments which are significant and appropriate for each species. This section will be pored over for cultural tips, and for suggestions for additions to one's own garden.

The photographs by Don Normark and others complement the text very well, with outstanding examples of flowers, foliages and settings for dynamic year-around appeal. The appendix contains an annotated list of nurseries where some of the more unusual plants mentioned may be obtained.

Briefly, this book provides what one ought to know in order to garden in the shade and love it. It is written in a delightful and humorous style by a person who shares of himself as he shares in his knowledge.

RUTH BAUGH



Events and Classes of Interest:

The Arboretum's free public lecture series is temporarily being offered at the Center for Urban Horticulture, pending the construction of the Arboretum's new Visitor Center.

MORNING LECTURES: 2nd Wednesday of each month, 10-11:30 AM; CUH Headquarters building.

February 13: "Roses: Care and Selection," by Edward Notske, representative of the Seattle Rose Society. Subjects to be covered are: The history of roses and how to care for them, pruning, and selection of high-quality varieties, with emphasis on modern roses.

March 13: "Primroses," by June Skidmore, who, with her husband Brian, is an active member of the American Primrose Society. An introduction to auriculas and numerous other species in order to expand your knowledge of the diversity available for gardens in the Pacific Northwest.

EVENING LECTURES: 3rd Monday of each month, 7-8:30 PM; CUH Headquarters building.

March 18: "Horticultural Tour of Korea," by Jean Witt. Slides from the tour led by the Witts in Autumn, 1982, emphasizing the native flora, many of whose species are highly prized garden subjects in the Pacific Northwest.

Arboretum Unit Council - Winter Classes

Classes are open to all Foundation members. Places in each class will be reserved on receipt of check, made payable to Arboretum Foundation, and marked "Unit Council Classes." Participants will be notified only if there is a change in class information or if the class is filled.

Mail check to:

Arboretum Foundation
University of Washington, SD10
Seattle, WA. 98195

Visit a wholesale nursery and see their operation in action!

Tour - Briggs Nursery
Wed., Feb. 13, 1985, 10-12 AM
Open enrollment
Fee: $3.00 plus transportation

Briggs Nursery in Olympia will give us a tour of their facilities, including a look into their cloning labs. Anyone interested in seeing a wholesale nursery in action should take advantage of this opportunity. If you are interested in carpooling, please indicate on registration form and you will be notified as to time and meeting place.

Visit a tropical paradise for a morning and see how Volunteer Park Conservatory has changed!

Tour Leader: Pricilla Dickert
Mon., Mar. 11, 1985, 10-12 AM
Location: Volunteer Park Conservatory
Open enrollment
Fee: $3.00

Pricilla will lead the tour through this historical conservatory and explain the changes that have occurred as well as the plans for the future.

Ikebana. Learn what you can do with a few flowers and a branch for winter bouquets.

Instructor: Sherri Pederson
Wed., Mar. 13, 1985, 10-12 AM
Location: Pat Calvert Greenhouse
Maximum enrollment - 12
Fee: $5.00

Sherri has just returned from studying in Japan and is eager to pass on her new information. Bring a needle frog, container (at least 10-inch diameter), cutting instrument, flowers and branches from the garden. Go home with a centerpiece! Dress warmly — especially feet!

University of Washington Extension

University of Washington Extension will offer a variety of programs Spring Quarter to Arboretum members. They include:

Gardening with Native Plants, on 6 Tuesdays, April 23 - May 18, 7 - 9 P.M., plus two field trips. Professor Arthur R. Kruckeberg, botanist, will concentrate on ornamental and practical uses of Northwest native plants for Puget Sound gardens. Fee: $46.

Seashore Life of Puget Sound, a one-day session on Saturday, June 22, 9 A.M. - 4:30 P.M., will feature the noted Professor Eugene Kozloff, zoologist. The variety of marine habitats, from rocky shores with tide pools to bays with sticky mud, will be explored. The course will combine a morning lecture with an afternoon shore trip. Fee of $36 includes transportation to the site.

Painting In The Parks with Nancy Halbrooks, M.F.A., will meet each week at a different Seattle park. Students will learn solutions to the problems and challenges confronting landscape artists. The class will meet on Saturdays, April 27 - June 8, 2:30 - 5:30 P.M. Fee is $50.

Discovering Birds: Cascades East Slope, a two-day weekender, May 11 - 12. The fee of $98 includes round trip transportation to Camp Field on Icicle Creek, lunches Saturday and Sunday, dinner Saturday evening at the Hotel Europa in Leavenworth, breakfast Sunday morning and lodging (double occupancy). Professor David A. Manuwal, Forest Resources, has especially chosen this time of year to focus on identifying birds by sight and sound and on how species change with habitat.

Kayaking The Wild Pacific Coast, a six-session course on Mondays, April 15 - May 20, 7:30 - 9:30 P.M.; fee, $43; on campus. Instructors are Dr. Randel Washburne, Forest Resources, an 11-year veteran of North Pacific kayak cruising and author of *The Coastal Kayaker;* and Linda Daniel, writer and expert in wilderness living with a kayak as home.

Journey Over The Cascades, a Saturday/Sunday field trip on May 18 - 19, will introduce students to the geological history and plant zones of the central Cascade range to the Columbia River. The fee of $114 includes van transportation from the campus, lunches Saturday and Sunday, dinner Saturday evening at the gourmet Cle Elum Inn, breakfast Sunday morning, lodging (double occupancy) in Cle Elum, and a pre-trip lecture on Thursday, May 16, 7 - 9 P.M. Instructors are Dr. Ola Edwards, plant ecologist, and Dr. Anthony J. Irving, geologist.

Alaska's Brooks Range: Noatak Odyssey, a 16-day excursion into an area considered by many to be the greatest remaining wilderness area in North America and perhaps the world. It is scheduled for August 16 - 31 and the fee is $1,925 plus airfare. For details contact Kathleen Helfrich, (206) 543-2300.

Landscape Architecture Field Trips, five Tuesday afternoon field trips, will introduce students interested in landscape architecture to typical projects. Visits to major projects in the Puget Sound region from Bellingham to Olympia are scheduled. Two identical sections are planned, running five weeks each, with Professor Richard Untermann of Landscape Architecture. Section A: April 2 - May 2; Tuesdays, 12:30 - 5:20 P.M., and Thursdays, 1:30 - 2:20 P.M.; Section B: May 7 - June 6: Tuesdays, 12:30 - 5:20 P.M., and Thursdays, 1:30 - 2:20 P.M. Fee is $86; and two credits will be awarded.

All these and many more programs are described in the University of Washington Extension catalog available by calling (206) 543-2300. For registration information call 543-2310.

VISIT YOUR ABORETUM IN EARLY SPRING

EXPLORERS' WALKS are offered throughout the year on the fourth Wednesday of each month. These two-hour walks begin at 10 a.m. in the Aboretum Greenhouse parking lot.

SUNDAY TOURS IN WINTER: This abbreviated series continues the popular "Sundays at One" that are offered from spring through October. Dates are February 10; and March 3. Meet on these Sundays at 1 p.m. in the parking lot of the Arboretum Greenhouse.

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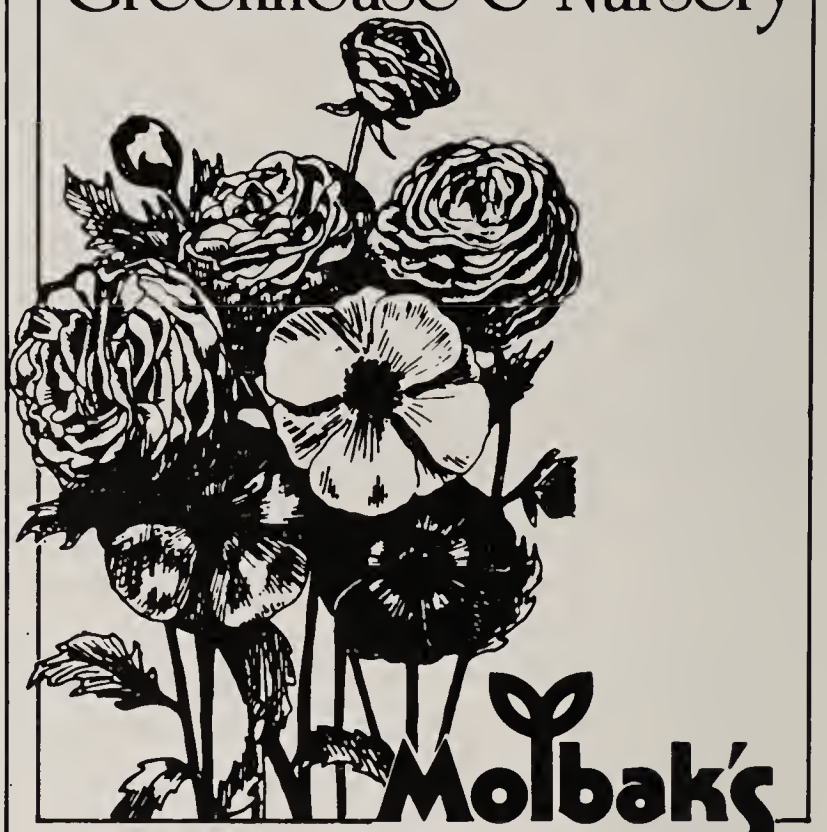

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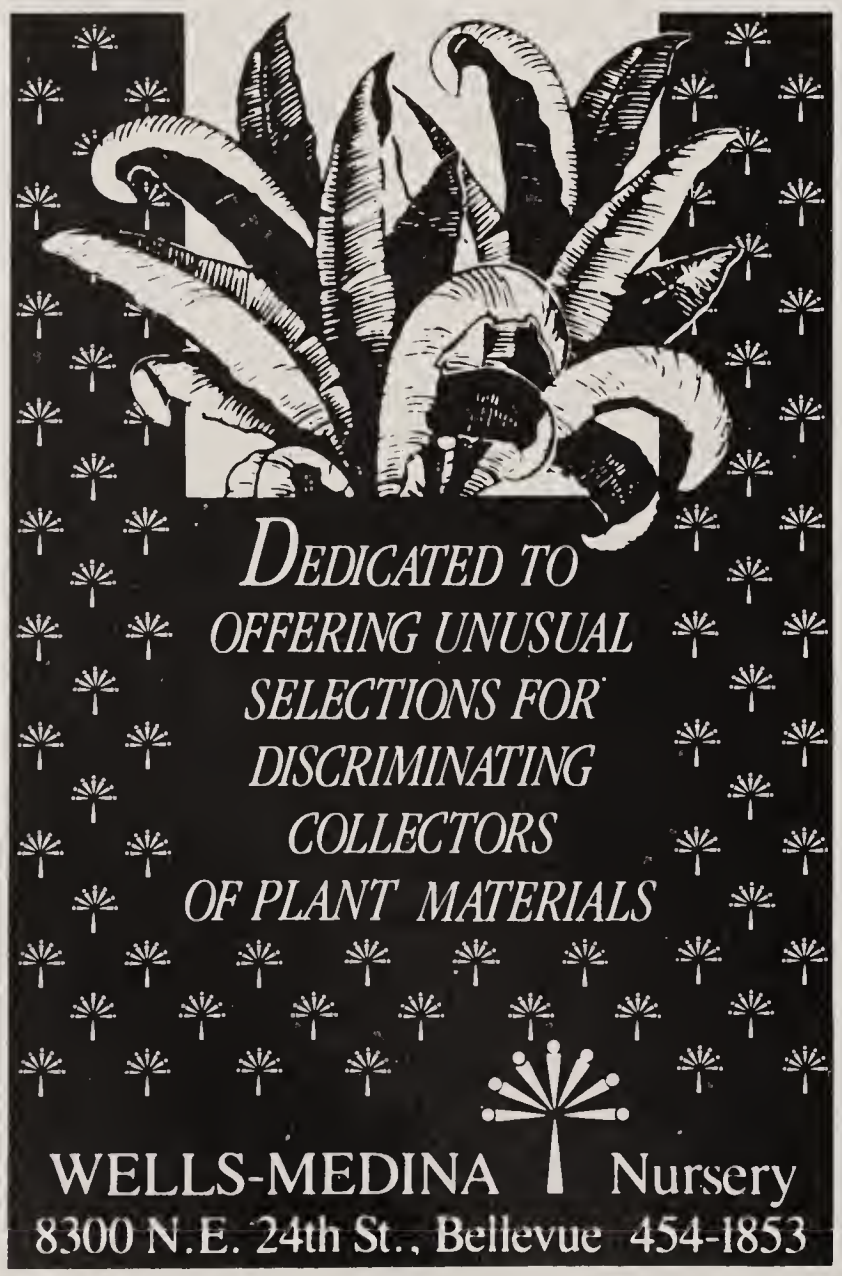

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